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The attached 1998-99 Quarterly Report documents the Nurturing ECSU Research Talent Program: Research Team Members, Mentors, Internships, Visiting Lectures and Highlight Photos.

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ONR RESEARCH TEAMS

Final Reports - AY 98-99

To: All ONR Research Team Members
From: Dr. Linda Hayden, NERT Principal Investigator
Re: Final Written and Oral Reports for Undergraduate Research Teams

Research Teams are required to make both oral and written reports of all research team activities. Preliminary written reports are due from all teams on April 13 & 15, 1999. Final version of the team reports will be due one week later. Final written reports should reflect all changes requested during the oral report. The final version should be delivered to Sharon Saunders in both hard copy and diskette format.

Written reports (both preliminary and final) for all teams should include the following:

1. Title Page
 - Team name
 - Date
 - Mentor's name, title, office location, phone, email address
 - Team members names, URL of individual webpages
 - URL of the team homepage (homepage must include team photo and abstract, plus links to individuals webpages)
2. Research abstracts (approximately 300 words or 1 page) should be included with the preliminary and final version of the written report. Abstracts should be written in past tense to reflect work completed.
3. The body of the research report should include literature reviews (articles, and reference books used)
4. Resume of the team mentor and for all team members.

Copies of all slides used for the oral report should be turned in with the final version of team reports. If Powerpoint or other electronic presentation package is used for the oral report submit a copy on 3.5" diskette or a zip diskette.

Oral Report (~ 30 minutes per team)

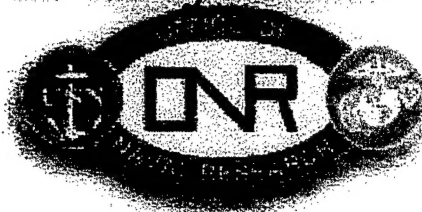
Teams should present their homepage showing the team abstract, link to final report, photos and links to the resume of all team members including the mentor.

Each team member should participate in the final oral report.

In creating the oral reports team members should use an electronic presentation package such as Persausion or Power Point. Submit a disk (zip or 3.5") version of your oral report.

N.E.R.T.

Nurturing ECSU Research Talent Elizabeth City State University



19981210 047

SUMMER 1998 RESEARCH ABSTRACTS ...

Bambo: A Portable System for Dynamically Extensible, Real-time, Networked, Virtual Environments

Researcher: Alicia Jones

Mentor: Dr. Simon Julier, ONR-NRL

Distributed virtual environments enable interactions between participants. One of the goals at the Naval Research Laboratory's Virtual Reality Lab is to be able to have various people in a virtual environment and be able to have a system load and unload information upon demand. Bamboo is a distributed, dynamically extensible virtual reality toolkit that is being developed by Kent Watsen and Mike Zyda at the Naval Postgraduate School in Monterey, CA. It came out in May 1997. Bamboo is named after the plant which is compromised of many intertwined shoots and roots. It is designed to facilitate the research and development of virtual environment application of multiple platforms. Bamboo supports callbacks, threads, and eventhandling. All three mechanisms work together so modules can be loaded and unloaded upon demand. The callback is one of the most fundamental mechanisms in all of Bamboo. Bamboo has gained the interest of the VR Lab because they would like to use this software with ongoing projects.

VRML 2.0 - Virtual Modeling Language Version 2.0 Development and Interactivity

Researcher: Donald Charity

Mentor: Dr. Edward Swan II, ONR-NRL

The purpose of my internship here at NRL was to develop programs and script in VRML to make interactivity between the user and program more efficient. Also, to develop template programs to cut back the length of scripted programming, time of production and time of production by inlining object files into the multipurpose event handling script generated in the template file.

The script developed will be used to inline multiple object files into real time battle situations with full versatility in movement in a Netscape browser. All template files have the option of moving an object in the X,Y,Z plane of the virtual world. This is important in the development of real-time battle situations. Another helpful tool, is Javascript in which, opens the world of highlighting, movement, and also mouse-over events. Used along with VRML, the programs developed become ever so more powerful and user friendly. Another advantage in using the template files is that the programmer is able switch in and out the objects that he or she wants to see in full movability. Because of its accessibility and viewability through Netscape.VRML is becoming a broader research field at the VR lab.

Optical Characterization of the absorption and emission properties of Tm doped FAP and S-FAP

Researcher: Santiel J. Creekmore
Mentor: Carl E. Bonner Jr.
Department of Chemistry and
Center for Materials Research, NSU

This research involved the optical characterization of a new laser material, Tm, doped fluorapatite and strontium fluorapatite. The absorption and emission properties of each material have been characterized using temperature dependent and polarization dependent absorption and emission spectroscopy. The energy levels of each crystal have been determined as well as the absorption and emission efficiency.

Generation of Test Tools to Exerciser Benchmark and Troubleshoot Network Equipment for Realtime CLCS

Researcher: Katrina Godwin
Mentor: John Porter, KSC for CLCS Lead
Network Systems, Kennedy Space Center

The Checkout and Launch Control System (CLCS) mission is to replace the current Launch Procession System (LPS) with standards - based, Commercial Off-The-Shelf (COTS) system and custom software. It will utilize multi-vendor platforms tied together with standard Local Area Network(LAN) technology. A program mandate is to replace the existing LPS without causing changes to the existing flight hardware or software and with no impact to the flight manifest. Ultimately, these tools will mature into a deliverable suite of tools to be used by the Operations Engineers in their day-to-day activities, as well as generating data to be used in the vendor selection of various network components. The tools were generated in the "C" programming language within the Unix environment and utilized, at a minimum, the User Datagram Protocol (UDP) and the Internet Protocol (IP) via the use of Unix sockets.

DOE Fossil Energy Website Using Homepage

Researcher: Courtney Fields
Mentor: Dorothy Fowlers &
Diana Greenhaligh
U.S. Department of Energy

The main goal of this project was to develop a homepage for Headquarters Fossil Energy HBCU Internship Program using HomeSite Software. The homepage consisted of a brief description of the program, links to the Fossil Energy homepage, Department of Energy educational homepage, and a link to several HBCUs involved in the program. The primary objective was to design and create a homepage using Hypertext Markup Language (HTML) and Homesite software. The second objective was to write an instructional manual to be used by the Headquarters Fossil Energy HBCU Internship Program coordinators. To achieve this goal, it was necessary to apply my educational and technical knowledge to, coordinate, consult, negotiate, and train the program coordinators throughout the process.

Simulation of Acoustic Wave Propagation in Randomly Layered Media

Researcher: Ayonda Moore
Mentor: Dr. Werner Kohler, Virginia Tech

This project involves the development of a MATLAB based simulation code to study acoustic wave propagation through finely layered material. The goal of this effort will be to ultimately compare the predictions to some existing theory with these simulations.

The code itself utilizes random number generators in MATLAB to create a large number of realizations (about 5000) of the layered material. Each realization consist of large macrolayers (approximately 10 layers and roughly kilometers thick). Within the materials sound speed changes randomly every three meters. Below this roughly 5 kilometers slab of random layering lies a semi-infinite basement. For each realization, the boundary value problem for the acoustic prob-

lem is solved not only for each realization but also for each frequency of interest. Ultimately the statistics of the ensemble of solution will be studied and compared with theory.

Temporal responses of the maize catalase to low temperature

Researcher: Tanya Granger
Mentor: Dr. John Scandalios
North Carolina State University

Catalase is primary antioxidant enzyme that can remove hydrogen peroxide (H_2O_2) rapidly and prevent the formation of reactive oxygen species. It is this enzyme that exhibits temporal differences in response to environmental factors. In this experiment the plant *Zea mays* (Maize) was used. In maize, the three unlinked structural catalase genes are Cat-1, Cat-2, and Cat-3 encode a catalase isozyme (Cat-1, Cat-2, Cat-3). It has been known that the expression of specific catalase isozymes is important and critical against oxidative stress induced by a given environmental stress. Four maize lines (W64A, WA10B, W19D and WDN7-1) were observed to see if the catalase isozymes are induced or reduced in an environment of 4 degrees Celsius. W64A is the maize standard inbred line which expresses all three cat genes. WA10B expresses Cat-2 gene. The W19D maize line expresses stages of their development. The chilling stress at 4 degrees Celsius will help to detect changes in the pattern of catalase isozyme expression through the course of normal postgermination development. The four maize lines were post imbibition for two and five days. This helps to detect if chilling has an effect on catalase. The cutella and axes of germinated seeds and developing kernels were studied. The catalase genes are expressed primarily in these parts of the corn kernel. The effect of catalase to low temperatures helps to detect the state levels of mRNA. This experiment determines if the chilling stress on catalase enzyme turns it gene on or off.

Zero-Based Rulemaking Project

Researcher: Sheri Joyner
Mentor: David Lehrman
Federal Department of Transportation

The ten-week internship at the Department of Transportation involves work with the Office of Motor Carrier. Currently, the Office of Motor Carrier is working on a project known as the "Zero-Base Rulemaking Project." The "Zero-Base Rulemaking Project" was launched in 1992 to improve the organization, format, and clarification of the FMCRs. The goal of this internship project was to establish a Web Page for the public in which there are links between the FMCRs and various other web sites.

To complete this process, various software packages such as Frontpage and Microsoft Network Composer was utilized. Knowledge of the overall structure of the agency and how various regulations become official was also a prerequisite. During this project, the need to learn a new technical vocabulary used by the Office of Motor Carriers and the Plain English Movement was essential.

The Statistical Analysis of Consumer's Choice in Athletic Footwear

Researcher: Lakisha Mundon
Mentor: Dr. Vinod Manglik, ECSU

This research involves conducting a study to determine which factors effect the way consumers purchase athletic footwear. The most effective way to conduct this research was to create a specifically designed questionnaire. The data collected was analyzed statistically by using the techniques for categorical data. Cross-tabulation and chi-square procedures were used to determine the significant effects. The primary factors which influence the consumer decision-making process are the type of shoe, the brand name, and the shoe price. Other variables that play a role in the selection process are race, age, salary, and sex. These are the independent variables. The dependent variable was the consumer's preference for

the athletic footwear.

Multimedia Authoring with Authorware

Researchers: Jonathan Williams, Je'aime Powell, Angela Mizelle

Mentor: Jeff Wood, U.S. Coast Guard Base
Dr. Atalla, University of Cairo

The N.E.R.T. Multimedia Group explored the world of interactive presentations through Authorware Software. First, the group learned Authorware basics by using the Macromedia Authorware 4 Authorized Hands-On Training booklet. Once the students had mastered the basic concept of Authorware, they then created their own story boards for an original presentation. The students presentation was called, "Authorware: From Us to You". With this presentation the students explained what Authorware is and its educational value. The primary audience was made up of fellow students who have not yet been exposed to this type of multimedia software. Students in the multimedia group also learned how to insert pictures, graphics, sounds and text into their original Authorware presentation. A field trip to the local United States Coast Guard Base allowed students to view several Authorware presentations created by staff at the USCG Media Center. While at the USCG, the students received other ideas and suggestions from Authorware users that enhanced the presentation.

The second stage of this project will involve providing support for an Interactive Multimedia Physics Training Package under development by the University of Cairo, Egypt. Egyptian PI will spend 4 weeks at ECSU to train with the team. Packages generated will be used by underclass physics majors at the University of Cairo.

A Comparison of Apache and NCSA Models to Establish the ECSU Sun 17 Hypertext Transfer Protocol Server.

Researcher: Kuchumi Hayden
Mentor: Dr. Kossi Edoh, ECSU

The purpose of this research project was to explain how to setup a World Wide Web Server using two different methods. The project tested servers based on the HTTP server developed by the National Center for Supercomputing Applications (NCSA) verses Apache 1.2.5.

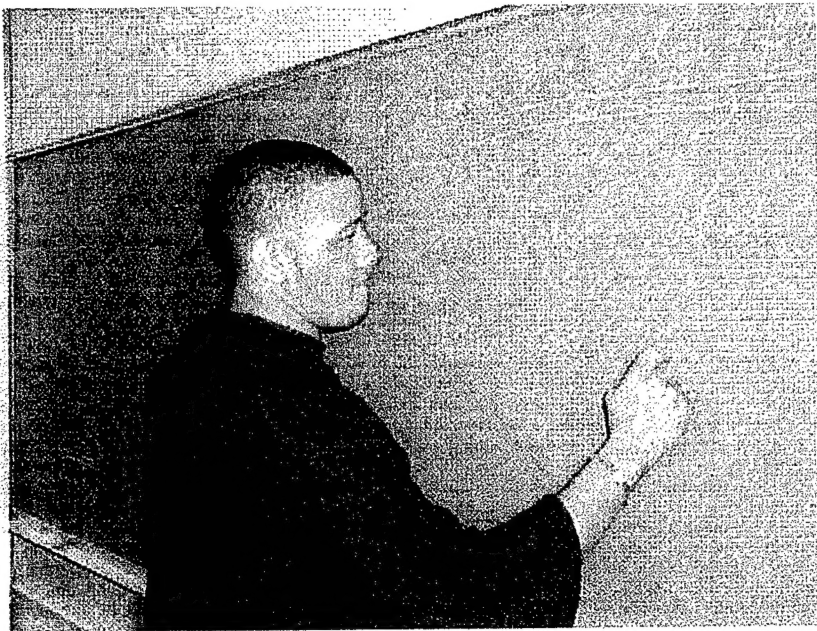
The National Center for Supercomputing Application (NCSA) was started at the University of Illinois at Urban-Champaign in 1985 with a grant from the National Science Foundation. NCSA is responsible for one of the most popular servers in this day and age. The NCSA server will compile and run on most UNIX systems.

The Apache server is a freeware Web server written by the Apache Group, a nonprofit organization of volunteer software developers. Apache is known to work with microcomputers and workstations running Solaris, SunOS, Next, HPUX, FreeBSD, BSDI, IRIX, Linus, SCO, AUX, AIX, DEC Unix, Ultrix, and UnixWare variants.

This project involved studying all aspects of installing a server. This machine was located in Lester Hall at Elizabeth City State University. The Apache web server is used as a backup for the ECSU NCSA web server. Our research will show the comparison of three security issues: 1) Login names and passwords needed to down load documents, 2) Use of proxies and 3) Use of virtual host.



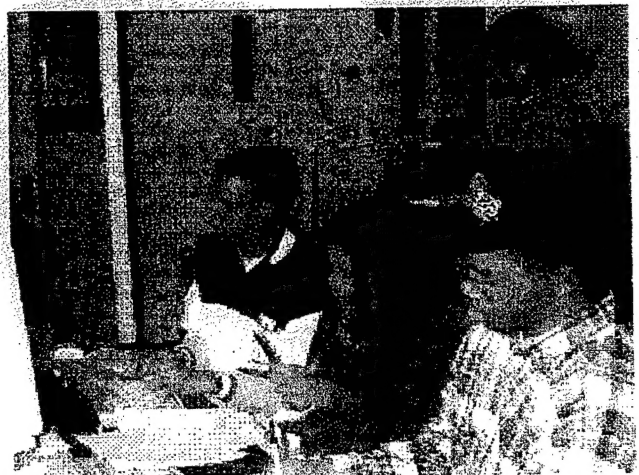
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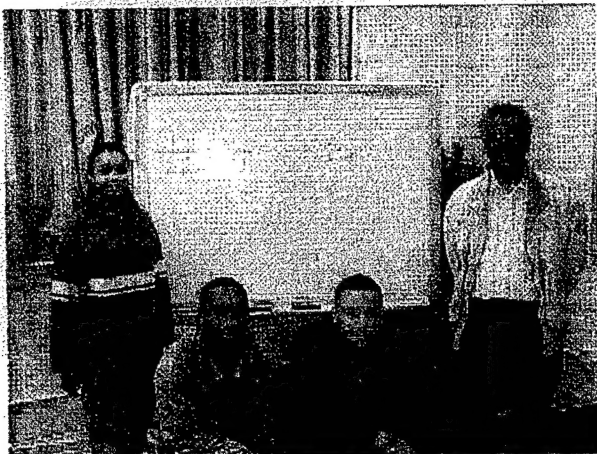
Multimedia Authoring Team Mentor



Multimedia Authoring Team Members



Fractals/chaos Team Members



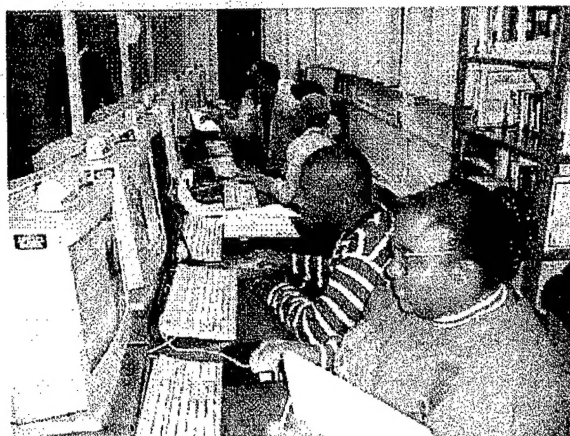
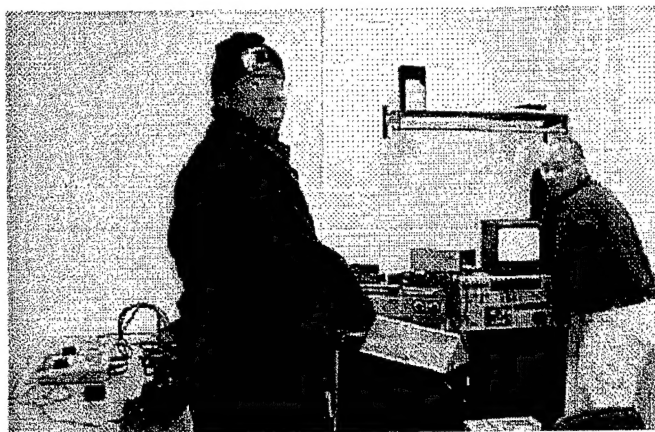
Physics Team plus mentor



Computer Visualization Team plus mentor

ONR Summer 1998 Summer Placement/Internship Report

Name	Class	Summer placement/internship
Mizelle, Angela	FR	ONR-AASERT Summer Bridge Program
Powell, Je'aime	FR	ONR-AASERT Summer Bridge Program
Williams, Jonathan	FR	ONR-AASERT Summer Bridge Program
Charity, Donald	SO	ONR- Naval Research Lab
Godwin, Katrina	SO	NASA-Kennedy SpaceCenter
Jones, Alicia	SO	ONR- Naval Research Lab
Joyner, Sheri	SO	ORISE Dept. of Transportation
Burrus, Derrek	JR	U S Coast Guard
Creekmore, Santiel	JR	NSU-Institute in Materials Science
Fields, Courtney	JR	Department of Energy
Hayden, Kuchumbi	JR	Ronald McNair Research Program
Moore, Ayonda	JR	Virginia Tech Summer Program
Mundon, Lakisha	JR	Ronald McNair Research Program
Rook, Antonio	JR	University of Alabama Summer Research
Anderson, Melvin	SR	NC A&T Fellowship and Morgan State High Performance Computing Program
Ellis, Corey	SR	IBM and New Mexico State University Fellowship
Felton, Curtis	SR	NC A& T Fellowship and FermiLab
Fenner, Arthur	SR	Dept. of Energy
Gatling, Charles	SR	NC A&T Fellowship and Morgan State High Performance Computing Program
Sessoms, Fred	SR	IBM
Turner, Jamaal	SR	Dept. of Transportation
Ward, Tammara	SR	IBM
Williams, Laverne	SR	FermiLab and Michigan State Univ. GEM Fellowship



Left: Multimedia Team at work. Right: Laverne Williams current graduate student at Michigan State University, Melvin Anderson and Charles Gatling current graduate students at NCAT.



Seniors Shown: Antonio Rook, Derrick Burrus, Kuchumbi Hayden, Santiel Creekmore, Courtney Fields, Lakisha Mundon and Michael Pugh.



Juniors Shown: Donald Charity, Katrina Godwin, Sheri Joyner and Alicia Jones.



Sophmores Shown: Joseph Gale, Angela Mizelle, Jonathan Williams and Je'aime Powell.

Freshmen Not Shown: Bernard Bailey, Latisha Freeman, Omar Gordon, Tina Lassister, Gregory Lassiter, Melvin Mattocks

1998-99 RESEARCH TEAMS ...

<u>Team Name</u>	<u>Mentors</u>	<u>Team Members (20)</u>
System Admin	Mrs. Marie Koltuniak Dr. L. Hayden	Tina Lassiter Fr/CS Latisha Freeman Fr/CS Courtney Fields Sr/CS Joseph Gale So/CS Sheri Joyner Jr/CS Omar Gordon Fr/CS Bernard Bailey Fr/Tech Melvin Mattock Fr/CS Katrina Godwin Jr/CS Donald Charity Jr/Math
ATM Networks	Mr. R. Harris Mr. D. Archer	Antonio Rook, Sr/CS Kuchumbi Hayden, Sr/CS
Physics	Dr. L. Choudhury	Santiel Creekmore, Sr/Phy Alicia Jones Jr/CS Lakisha Mundon Sr/Math Michael Pugh Sr/Phy
Multimedia	Mr. J. Wood Dr. N. Oriaku	Jonathan Williams, So/CS Je'aime Powell, So/CS Angela Mizzelle So/CS Gregory Lassiter Fr/CS

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<http://nia.ecsu.edu/onr/onr.html>

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